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TITLE: Military-Relevant Infectious Diseases Endemic to Kenya: Epidemiology, Immunology, Pathophysiology, Treatment, and Prevention.

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<b>13. SUPPLEMENTARY NOTES</b>					
<b>14. ABSTRACT</b> The mission of USAMRU-K is to develop and test improved means for predicting, preventing and treating worldwide infectious disease threats to deployed U.S. military personnel. USAMRU-K is heavily involved in global surveillance, training, research in drug and vaccine development, and response to emerging infectious disease threats. These activities are undertaken in research laboratories and field stations in locations where Malaria, HIV/AIDS, leishmaniasis, Rift Valley Fever virus, Chikungunya virus, enteric pathogens, and other military-relevant infectious diseases are prevalent and their transmission rates are high. Malaria drug and vaccine trials executed at the Kombewa field site to provide valuable information to inform protective strategies for the warfighter. During this 2 year extension to the Cooperative Agreement, USAMRU-K's ability to successfully execute clinical studies has been enhanced by the utilization of new state-of-the-art laboratories. The co-location of these modern clinical research facilities within high disease endemicity areas has positioned USAMRU-K as a preferred site for future vaccine, drug, and other interventional trials.					
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**Military-Relevant Infectious Diseases Endemic to Kenya: Epidemiology,  
Immunology, Pathophysiology, Treatment, and Prevention**

**Addendum to Final Report Covering the Period March 2005 to February 2007**

**US ARMY MEDICAL RESEARCH UNIT – KENYA**

The mission of the United States Army Medical Research Unit-Kenya (USAMRU-K), a special foreign activity of the Walter Reed Army Institute of Research (WRAIR), is to develop and test improved means for predicting, preventing and treating worldwide infectious disease threats to deployed U.S. military personnel. USAMRU-K is heavily involved in global surveillance, training, research in drug and vaccine development, and response to emerging infectious disease threats.

**PERSONNEL**

**Personnel Present or Arriving during the Report Period**

COL Samuel Martin, MC, Commander  
COL Douglas Walsh, MC, Malaria Clinical Trials  
LTC Mark Polhemus, MC, Clinical Trials  
MAJ Jean Muderhwa, MS, KDOD PEPFAR Program  
MAJ Jason Richardson, MS, Vector Studies  
CPT Kurt Martin, MS, Clinical Laboratory Officer  
CPT David Schnabel, MC GEIS Coordinator  
Dr. Douglas Shaffer, MD, MPH, HIV/AIDS Vaccine Trials, PEPFAR  
Norman Peterson, Ph.D, GS-11 Administrator  
John Waitumbi, DVM, Ph.D, KEMRI  
Bernhards Ogutu, MD, Ph.D, KEMRI

**Personnel Departing During the Report Period**

LTC(P) Mark Withers, MC, Malaria Clinical Trials  
LTC Van Sherwood, MS, Vector Studies  
LTC Gina Marie Foglia, MC, HIV/AIDS  
MAJ(P) Shon Remich, MC, Malaria Drug Development  
CPT(P) Cheryl Bedno, MC, GEIS Coordinator

## **PROGRAMS**

### **KISUMU FIELD STATION**

#### **Malaria Clinical Trials - Clinical Trials Support (CTS)**

COL Mark Withers, COL Doug Walsh, LTC Mark Polhemus, MAJ Shon Remich,

Background:

Malaria drug and malaria vaccine clinical research teams were consolidated into a single section in 2006, called CTS. CTS is comprised of MDs, PhDs, PAs, nurses, lab techs, pharmacists, receptionists, records clerks, drivers, field workers, counselors, IT and custodial staff, about 60 in all.

To help define this new section, the **mission statement** read as follows: “To pursue with compassion and scientific rigor, the execution of regulated clinical trials and basic laboratory and pathogenesis research for the development of vaccines, drugs, and diagnostic platforms for the diseases of Africa and the world.”

Accomplishments:

The main clinical study sites were Kombewa CRC and newly added Ward 8, NNPBGH, adjacent to WRP-Kisumu HQ. Satellite sites were established in hospitals and clinics throughout West Kenya for surveillance-type, sample collection work.

A clinical research coordinator (CRC) training program was started, culminating in the establishment of an East African chapter of the ACRP, managed by Walter Reed staff, the 1<sup>st</sup> in East Africa. Three Kenyan CRCs were subsequently “certified” by examination as C-CRCs, a first for East Africa.

A clinical investigator training program for Kenyan investigators was started. Two Kenyan MDs completed the training program and went on to serve as PIs on regulated trials.

The number of human use studies conducted in this 2 year period by CTS was remarkable, shown in the Table below.

<b>Year</b>	<b>Trial (short title)</b>	<b># Volunteers</b>	<b>Sponsor</b>	<b>Licensure</b>
2005-07	Malaria Epi and Correlates of Protection (Maseno) <b>PI – Dr. Remich</b>	240 adults	WRAIR	No
2005-2006	MSP-1 42 3D7 phase IIb (mal 36) <b>PI – Dr. Bernhards Ogutu</b>	400 children	MVI/ WRAIR	Yes
2005-2006	RTS,S phase IIb (mal 44) <b>PI – Dr. Mark Polhemus</b>	255 adults	WRAIR/GSK	Yes
2006	Severe Malaria Epi <b>PI – Dr. Shon Remich</b>	400 adults	WRAIR	No

<b>Year</b>	<b>Trial (short title)</b>	<b># Volunteers</b>	<b>Sponsor</b>	<b>Licensure</b>
2006	IV Artesunate phase II <b>PI-Dr. Shon Remich</b>	30 adults	WRAIR	Yes
2007	Paediatric Coartem phase II <b>PI – Dr. Bernhards Ogutu</b>	30 children	MMV	No
2007	AZ/CQ Phase III (multi-center) <b>Dr. Bernhards Ogutu</b>	50	Pfizer	Yes
2006-2007	Complement & Severe Malaria <b>PI – Dr. John Waitumbi</b>	120	Ellison Foundation	No
2007	Collection of Multiple Pathogens for Diagnostics Development (DxBx) <b>PI – Dr. John Waitumbi</b>	200	PATH	Yes
2002-2007	Epi of Malaria and Drug Sensitivity (MDR) <b>PI – Drs. Coldren, Walsh, others</b>	Rolling enrollment	GEIS	No

Selected papers:

1. Polhemus ME, Magill AJ, Cummings JF, Kester KE, Ockenhouse CF, Lanar DE, Dutta S, Barbosa A, Soisson L, Diggs CL, Robinson SA, Stewart VA, Ware LA, Brando C, Krzych U, Bowden RA, Cohen JD, Dubois M, Opokua O, De-Kock E, Ballou WR, Heppner DG. Phase I dose escalation safety and immunogenicity trial of Plasmodium falciparum apical membrane protein (AMA-1) FMP2.1, adjuvanted with AS02A, in malaria-naïve adults at the Walter Reed Army Institute of Research. *Vaccine* 2007 May 22; 25 (21):4203-12

2. Heppner DG Jr, Kester KE, Ockenhouse CF, Tornieporth N, Ofori O, Lyon JA, Stewart VA, Dubois P, Lanar DE, Krzych U, Moris P, Angov E, Cummings JF, Leach A, Hall BT, Dutta S, Schwenk R, Hillier C, Barbosa A, Ware LA, Nair L, Darko CA, Withers MR, Ogutu B, Polhemus ME, Fukuda M, Pichyangkul S, Gettyacamin M, Diggs C, Soisson L, Milman J, Dubois MC, Garcon N, Tucker K, Wittes J, Plowe CV, Thera MA, Duombo OK, Pau MG, Goudsmit J, Ballou WR, Cohen J. Towards an RTS,S-based, multi-stage, multi-antigen vaccine against falciparum malaria: progress at the Walter Reed Army Institute of Research. *Vaccine* 2005 Mar 18; 23 (17-18):2243-50

### **Center of Excellence for Malaria Microscopy (CoE)**

CPT Kurt Martin, MAJ Ellis King

Background: The purpose of the Center of Excellence is to conduct malaria microscopy training courses and related studies. The CoE was developed in 2003 as a GEIS project and through the efforts of COL Colin Ohrt. The 1<sup>st</sup> class was in 2004. Since then, training demands have been increasing and clinical studies have been added to the center's activities.

Accomplishments:

1. By Feb 2007, the CoE had conducted more than 15 three week courses, training over 280 students from more than 10 countries, including those from the African (most), European and Asian continents.
2. An article was published in the Malaria Journal, 12 June 2007, describing CoE activities.
3. Organizations that interacted with CoE included PMI (via USAID, CDC), Malaria Clinical Trials Alliance (Ghana), Kenyan Ministry of Health, Centers for Disease Control (CDC), World Health Organization, clinical research groups throughout Africa, GlaxoSmithKline (GSK), and Pfizer.

Future activities and goals include relocation to a dedicated facility, 0.5 km from HQ, PMI-supported training, achieving formal certification, evaluation of rapid diagnostic tests (RDT), GCLP training and assisting in setting up other CoEs (e.g., Ghana). A major effort is to expand the CoE to a “Center for Malaria Control”, including an entomology component, and a malaria diagnostic teaching center that includes ELISA and RDT assays, in addition to microscopy. This may be possible through increased GEIS funding and funds from the President’s Malaria Initiative (PMI). Challenges remain for the future including marketing, funding, and adequate staffing to provide continuous training.

Two minimal risk human use studies received approval that complemented the mission of the CoE:

1. “Human Blood Collection for Evaluation and Creation of Standardized Diagnostic Sets for Training and Maintenance of Quality Diagnostics in Clinical and Research Settings” WRAIR Protocol 1306, KEMRI SSC 1111
2. “Establishment of a specimen Bank for evaluation of rapid diagnostic tests (RDTs) for Malaria diagnosis at KEMRI” WRAIR 1323, KEMRI SSC 1114 (WHO sponsored)

### **Basic Science**

#### **Dr. John Waitumbi**

In the period 1 March 2005 thru 28 Feb 2007, the research capabilities of the lab experienced tremendous growth in terms of the number of: 1) projects executed, 2) international collaborations established, 3) grants awarded and 4) students trained. During this period the lab transitioned from being just a provider of lab support to clinical studies to a self sustaining research program. The leadership has focused on how to develop quality lab infrastructure, funding and capacity building.

#### **Laboratory infrastructure:**

Through team work with the Clinical Trial program, the laboratory acquired a state of the art real time PCR machine that has allowed us undertake studies requiring quantitative gene expression and allelic discrimination. The lab also upgraded the FACScan from three to five color capability. Set aside money to purchase a “Luminex”

machine, which will allow the lab to compete for studies requiring multiplex serological and molecular diagnoses.

**Funding:**

Annual funding has steadily increased from 126K in years 2005 to 240K in 2006/2007 as shown below.

2003-05	US Army Internal Grant entitled: Apoptosis in malaria: a non-immune mechanism for regulating parasite growth. Annual funding: \$56,000.00
2004-07	Ellison Medical Foundation Research grant entitled: Investigation of Mechanisms Leading to Anemia at Low Parasite Burden in Children with Malaria. Annual funds: \$70,000.00
2006-07	PATH: Collection of samples for multiple pathogen diagnostics development: Identification of pathogens that could cause fever in children in western Kenya: \$114,000.00

**Collaborations:**

Developed new and or maintained existing international research partnerships as shown below:

- 1) Joint grant from Ellison Medical Research Foundation with University of Virginia to study mechanisms leading to anemia at low parasite burden in children with malaria.
- 2) Obtained a grant from PATH for collection of samples for multiple pathogen diagnostics development

During this period, we also conducted the following assays in support of malaria vaccine program: 1) Flow cytometric assessment of antigen specific T-cell responses before and after immunization 2) Analysis of MSP-1<sub>19</sub> alleles of malaria parasites in children immunized with MSP-1<sub>42</sub> malaria vaccine candidate antigen 3) Antibody ELISA in children immunized with MSP-1<sub>42</sub> experimental vaccine 4) Determination of RBC polymorphisms that may confound interpretation of immunity data generated by malaria vaccines.

**Accomplishments:**

- 1) Flow cytometric assessment of antigen specific T-cell responses in cohorts participating in the RTS,S/AS02A, and RTS,S/AS01B malaria vaccines study
- 2) Determination of antigenic diversity within the Th2R and Th3R immunological determinant site of CS protein in samples collected from cohorts receiving RTS,S/AS02A, and RTS,S/AS01B by DNA sequence analysis
- 3) Determination of effects of the RTS,S/AS02A and RTS,S/AS01B vaccines on the multiplicity of infection (MOI) by examining the polymorphic *msh1* and *msh2* genes of *P. falciparum* isolates



4) Analysis of MSP-119 allelic variants of malaria parasites in children immunized with MSP-142 malaria vaccine candidate antigen

5) Antibody ELISA in children immunized with MSP-142 experimental vaccine

6) Evaluation of the usefulness of HRP2 and pLDH in quantification malaria parasite biomass

7) Determination of RBC polymorphisms that may confound interpretation of immunity data generated by malaria vaccines

8) Analysis of molecules expressed on RBCs and B-cells in children with malaria

### **Student supervision/capacity building:**

**Amos Kungu** was a PhD student studying the dynamics of *P. falciparum* MSP-1 alleles following vaccination with MSP-1 antigen

**Sammy Anyona** was a PhD student analyzing the antigenic diversity within the immunological determinant site of CS protein in samples collected in cohorts receiving CSP malaria candidate vaccine

**Carol Kifude** was a masters student studying the prevalence of sickle cell and  $\alpha$ -thalassaemia traits in children enrolled in a malaria vaccine clinical trial, in Kombewa, Western Kenya

**Carol Hunja** was a MSc student studying the frequencies of glucose-6-phosphate dehydrogenase deficiency in children enrolled in a malaria vaccine clinical trial, in Kombewa, western Kenya

**Beth Mutai** is a MSc student studying whether malaria parasites uses apoptosis to auto-regulate parasite density

**Nancy Nyakoe** is a MSc student studying complement utilization in children at various stages of malaria

**Jackson Cheruiyot** is studying the expression level of CD21 on B-lymphocytes in children at various stages of malaria

**Joseph Nganga** was a postdoc fellow investigating the basis of genetic immunity to malaria

### **Publications:**

Kifude CM., Polhemus ME, Heppner DG, Withers MR., Ogutu BR., and Waitumbi JN. Hemoglobin Kenya Among Luo Adults and Young Children in Malaria Holoendemic Western Kenya: Screened by High Performance Liquid Chromatography and Confirmed by Polymerase Chain Reaction. Hemoglobin. 2007, 31(4): 1-8.

Pawluczkowycz AW, Lindorfer MA, Waitumbi JN, Taylor RP. Hematin promotes complement alternative pathway-mediated deposition of C3 activation fragments on human erythrocytes: potential implications for the pathogenesis of anemia in malaria. J Immunol

Waitumbi JN, Kifude CM, Withers MR, Polhemus ME, Heppner DG Jr, Ogutu BR. Hb G-Philadelphia or Stanleyville II? When the phenotype and genotype do not agree. *Eur J Haematol.* 2007 Aug;79(2):177-8.

Withers MR, McKinney D, Ogutu BR, Waitumbi JN, Milman JB, Apollo OJ, Allen OG, Tucker K, Soisson LA, Diggs C, Leach A, Wittes J, Dubovsky F, Stewart VA, Remich SA, Cohen J, Ballou WR, Holland CA, Lyon JA, Angov E, Stoute JA, Martin SK, Heppner DG. Safety and Reactogenicity of an MSP-1 Malaria Vaccine Candidate: A Randomized Phase Ib Dose-Escalation Trial in Kenyan Children. *PLoS Clin Trials.* 2006 Nov 24;1(7):e32

Anyona SA, Schrier LS., Gichuki CW., Waitumbi JN. Pitting of malaria parasites and spherocyte formation. *Malar J.* 2006 Jul 31;5:64.

Craig ML, Waitumbi J. N. and Taylor R.P. Processing of C3b-Opsonized immune complexes bound to non-CR1 sites on red cells: Phagocytosis, transfer and associations with CR1. *J. Immunol.* 2005. 174:3059-66.

### **Entomology and Vector Biology - Kisian** **MAJ Jason Richardson**

#### **Background:**

During the period 1 March 2005 thru 28 Feb 2007, the Entomology program at USAMRU-Kenya transitioned from a support program to a stand alone research program. This coincided with a relocation of the main laboratory facility and personnel to the Kisian location from Nairobi in 2005. LTC Van Sherwood was replaced by MAJ Jason Richardson in August of 2005. Although the majority of the Department moved to the KEMRI facility at Kisian, the sand fly surveillance and control team remained in Nairobi. This team also served as a liaison team on arbovirus surveillance and outbreak response in coordination with the GEIS coordinator. During this period the Department focused on two areas of ongoing research (sand fly control and arbovirus surveillance) while the leadership dedicated itself to long term planning, funding, and building collaborative relationships.

#### **Funding:**

Funding had been a significant issue up until the beginning of FY05. Annual funding from FY02-FY04 averaged 23K per year. This grew to 177K in FY05 and 374K in FY06. A portion of this funding was used to replace an old 4WD vehicle and build a sand fly study enclosure. Other significant improvements included resourcing a basic molecular biology laboratory and a small mosquito insectary. This increase reflects efforts to diversify and build credibility to attract funded collaborators including: MIDRP, GEIS, CDC, USAMRIID, USDA, Michigan State University, Wageningen University

**Collaborations:**

Developed research partnerships with 3 different USDA laboratories:

- (1) the Arthropod-Borne Animal Diseases Research Laboratory (ABADRL) in Laramie, Wyoming. Focus is on Rift Valley fever virus vectors.
- (2) the Center for Medical and Veterinary Entomology (CMAVE) in Gainesville, FL. Focus is on product evaluation for mosquito and sand fly surveillance and control. We are negotiating a 5 year cooperative agreement.
- (3) the National Wildlife Research Center in Fort Collins, Colorado. Focus is on rodent-borne disease surveillance.

This period showed major progress in our collaboration with GEIS in both routine arbovirus surveillance and in vector-borne disease outbreak investigations as well as a new program to conduct surveillance for zoonotic pathogens in small mammal reservoirs.

**Accomplishments:**

**1. (2005-2007) Characterization of malaria transmission in Western Kenya continues.** Started as a multi-year project in mid-2002 in support of a new vaccine study site when the malaria vaccine program moved to a new study site in the vicinity of Kombewa to establish the relative importance of *An. gambiae* and *An. funestus*, determine biting pressure and malaria infectivity of the vector, and study the dry season ecology of *An. gambiae*. The field data collection ended in Oct 2005 and data was analyzed and presented to the malaria research team in Kombewa in July 2007. The entomology team mapped the MAL 44 volunteer houses and produced GIS map products for both MAL 36 and MAL 44. This team also digitized and began analysis of 5 years of Anopheles field data collected by previous investigators. The combined vector, environmental, and map database are now being used to address questions about malaria transmission focality. Further spatial analysis is on-going with the goal to publish in 2008.

**2. (2006 - 2007) Rift Valley Fever outbreak response.** The Department lead the entomology response to the 2006-2007 Rift Valley fever outbreak. Personnel planned and executed all entomological investigations and response efforts including organizing a task force comprised of 24 personnel from 2 Kenyan government, 5 U.S. government, and 2 international agencies. The Department implemented vector surveillance in Garissa district prior to the first sign of RVF cases and collected approximately 200,000 mosquitoes and sand flies and isolated 30 RVFV isolates. Efforts also resulted in implication of mosquitoes species not previously found infected with RVFV in Kenya and detection of mosquitoes infected with a virus only known to occur in Southern Africa. The outbreak response paper is in revision two and will be published in 2008.

**3. (2006) *Aedes mcintoshi* population genetics study.** Dr. Kristine Bennett from the USDA lab in Wyoming (ABADRL) completed two trips to various sites around Kenya to collect RVFV vector mosquitoes as part of a phylogeny/gene flow study of *Aedes mcintoshi*. Samples have been collected at approximately 100 sites on 2 transects: (1)

from the Garissa south to Kilifi and (2) from Kilifi through Nairobi to Busia on the Ugandan border.

**4. (2007) Mosquito taxonomy training course.** The Department organized and hosted a two week training course to address the lacking expertise in mosquito identification in Africa. Instructors from the Walter Reed Biosystematics unit spent two weeks training personnel from East Africa in the Walter Reed Center of Excellence in Microscopy training facility in Kisumu. The course was funded by GEIS.

**5. (2005 - 2006) Nairobi malaria transmission study.** The Department conducted a thorough QA review of the data set collected in 2002-2004 and converted it to a new excel database.

**6. (2005 – 2007) Sand fly control studies. Integrated control methods for sand flies—MIDRP U0059-05-WR, KEMRI #969. Background/Summary:** This was a 3 year, multilab study coordinated by WRAIR. It involved CRADAs with two bed net manufactures. The study involved 1 year of vector surveillance to establish the baseline density of sand fly populations followed by 2 years of control method testing. Control methods evaluated included: various insecticide treated bed nets (ITNs), insecticide treated tents, residual insecticide treatment of larval habitat, barrier insecticide spraying. The primary objective was to test and improve control methods for sand flies with the aim of developing an integrated sand fly control system. In 2007 Dr. Gaby Zollner from WRAIR completed her last Kenya TDY to supervise the final phase of the three year study. Data is being analyzed and multiple publications are planned. The study was conducted in Marigat, Baringo District and was a tremendous success. The Department plans to continue the study of sand fly control and leishmaniasis transmission in the area. In 2007 a Deployed Warfighter Protection Program grant enabled the renovation of lab space in Marigat for a field sand fly insectary. This facility is collocated with the Department's sand fly field station and 200m<sup>2</sup> sand fly study enclosure.

**7. (2005 – present) Field evaluation of PCR assays for arboviruses—MIDRP U0094-06-RD.** Dr. John Lee and LTC Monica O'Guinn traveled to Kenya numerous times during this period to conduct field testing of their real-time RT-PCR arbovirus assays. These trips have resulted in great improvements of the assay platforms and procedures as well as the isolation of multiple arbovirus isolates from the region. This has resulted in one publication (Turell et al., 2007) and will likely translate into many others.

**8. (2005 – present) GEIS Arbovirus surveillance (WRAIR # 1134, KEMRI #824).** In 2005 four sites were selected to serve as routine mosquito and tick surveillance sites in Kenya. In 2007 the number of sites was increased to ten. This work is conducted in conjunction with the study above. The fact that the Department had been conducting routine mosquito surveillance translated into a rapid and effective response effort to the RVFV outbreak.

**9. 2006 – present) Small mammal virus surveillance.** Dr. Jeff Root from the USDA, National Wildlife Research Center and Dr. Darin Carroll from CDC, Atlanta completed

an initial field collection of small mammals in 2007. They performed serological screening for hantaviruses while in Kenya. Samples have been approved for export to the CDC Atlanta for PCR/RT-PCR and virus isolation. Based on promising preliminary data, the Department submitted a GEIS FY08 proposal to expand this work. The proposal was funded.

**10. (Ongoing)** Field evaluation of novel arthropod repellents and repellent formulations. Following the repellent trials conducted in 2004, the Department wrote a new protocol and submitted it to KEMRI in order to execute a new study in FY06/07. This was deemed unethical by the KEMRI IRB and the study has been on hold while members of the Department attempt to convince the IRB of the importance of the study.

#### **Publications:**

Turell MJ, Lee JS, Richardson JH, Sang RC, Kioko EN, Agawo MO, Pecor J, and O'Guinn ML. 2007. Vector competence of selected Kenyan mosquito (Diptera: Culicidae) species for Rift Valley fever virus. *J Am Mosq Control Assoc.* 23(4):378-382.

Centers for Disease Control and Prevention (CDC). 2007. Rift Valley fever outbreak--Kenya, November 2006-January 2007. *MMWR Morb Mortal Wkly Rep.* 2;56(4):73-6.

Salazar MI, Richardson JH, Sanchez-Vargas I, Olson KE, Beaty BJ. 2007. Dengue virus type 2: replication and tropisms in orally infected *Aedes aegypti* mosquitoes. *BMC Microbiol.* 30;7(1):9

Richardson JH, Molina-Cruz A, Salazar MA, and Black WC IV. 2006. Quantitative analysis of dengue-2 virus RNA during the extrinsic incubation period in individual *Aedes aegypti*. *Am J Trop Med and Hygiene* 74: 132-141.

#### **Presentations:**

Sept 2006 - 2<sup>nd</sup> Leishmania Exo-Antigen Meeting, Mombasa, Kenya: "Sand Fly Control Research at USAMRU-K"

Feb 2007 - DoD Pest Management Conference, Jacksonville, FL:

- (1) Entomological Investigations of a Rift Valley fever virus outbreak in Kenya -- December 2006 – February 2007,
- (2) Development of Sand Fly Control Methods in Kenya.

April 2007 - American Mosquito Control Association Annual Meeting, Orlando, FL:

- (1) RVFV Outbreak in Kenya,
- (2) Development of Sand Fly Control Methods in Kenya.

## **KERICHO FIELD STATION**

### **HIV/AIDS**

**Dr. Douglas Shaffer**

## DESCRIPTION

The Division of Retrovirology, Walter Reed Army Institute of Research funds and supports HIV research activities executed by the United States Army Medical Research Unit (USAMRU-K) as part of its global network of partners known as the U.S. Military HIV Research Program (USMHRP). The USAMRU-K HIV Program is located in the southern Rift Valley Province in the town of Kericho at the Kenya Medical Research Institute (KEMRI)/Walter Reed Project (WRP) Clinical Research Center. The USAMRU-K HIV program's primary mission is contributing to the development of a globally effective HIV-1 vaccine to protect US military service members, allied forces, and the world community through evaluating HIV vaccine candidates in clinical trials. The USAMRU-K HIV program is divided into two components: comprehensive HIV clinical research (including vaccine, therapeutics, and observational/cohort) and HIV prevention, care, and treatment under the President's Emergency Plan for AIDS Relief (PEPFAR) as one of the US Government agencies implementing PEPFAR in Kenya.

For HIV vaccine research as part of the USMHRP mission, the current goal is to develop a globally effective HIV-1 vaccine based upon genetic subtypes or clades of HIV-1 prevalent in different regions of the world. The USMHRP has already advanced a prime-boost, circulating recombinant form (CRF)01\_AE / clade B vaccine strategy to efficacy testing in Thailand, where CRF01\_AE is most prevalent. A similar strategy is ongoing in East Africa where clades A, C, and D are contributing in varying proportions to the HIV epidemic in the region. The USAMRU-K's first HIV vaccine study opened in April of 2006 and by the end of this reporting period had fully enrolled and was in final follow-up. Sponsored by the Vaccine Research Center of the Division of AIDS/National Institutes of Health, U.S.A., this Phase I/II clinical trial was designed to evaluate the safety and immunogenicity of a multiclade HIV-1 DNA plasmid vaccine boosted by a multiclade HIV-1 recombinant adenovirus-5 (rAd5) vector vaccine in HIV uninfected adult volunteers in East Africa. Finally, by the end of this reporting period, plans were ongoing with protocol development for a test-of-concept Phase IIb follow-on study to the Phase I/II DNA-rAd5 and a cohort study evaluating HIV prevalence, incidence, cohort retention, and host genetics and viral diversity in high risk persons as part of a larger USMHRP network study in Kenya, Uganda, Tanzania, and Thailand.

In addition to vaccine research supporting the primary program mission, the HIV Program in Kericho also conducts therapeutic, operational, and economic research complimenting the primary mission and as part of a larger comprehensive research/care and treatment portfolio. Under a grant held by Boston University, The KEMRI/WRP HIV program continued its >4 year collaboration with Boston University and KEMRI to conduct economic and health outcomes research. Also during this period, the program began therapeutics research sponsored by the NIH/NIAID/Division of AIDS.

## ACCOMPLISHMENTS

1. The only WRAIR supported research site outside of the United States conducting concurrent observational cohort, Phase I/II vaccine, and Phase III therapeutics studies while offering comprehensive care and treatment services.
2. The first and largest HIV vaccine study (Phase I and II) in Kenya to occur outside of Nairobi (the 3<sup>rd</sup> HIV study in Kenya's history) was ongoing.
  - A. Completed both Phase I (n=48) and II (n=72) enrollments in 4 months (3 months ahead of schedule)
  - B. 98.3% retention (2 withdrawn from study); 0.4% out-of-window visits
  - C. PPD monitoring results excellent with no major protocol violations
3. The foundation HIV cohort study completed final, 36 month follow-up in December 2006 with study analyses ongoing.
  - A. Largest prospective HIV cohort study in Kenya to date
  - B. Only prospective HIV cohort study in East Africa with 36 months of follow-up with ~ 82% retention
  - C. Several peer-reviewed manuscripts published with more in preparation
4. The NIH Sponsored Phase III therapeutics study (Optimal Combination After Nevirapine Exposure, OCTANE) opened with site recognized for exemplary Success.
  - A. Kericho 4<sup>th</sup> to open of 10 African sites (others already NIH established sites)
  - B. Fastest enrolling site to date
  - C. PPD monitoring with excellent results with strict adherence to GCP
5. The Boston University-KEMRI-WRP collaboration extends breadth and depth of research after demonstrating the impact of HIV on labor productivity to include:
  - A. impact of ART on labor productivity
  - B. impact of ART on health economic outcomes in persons receiving ART in Ministry of Health and Mission HIV clinics
6. More than 20 abstracts have been presented at international meetings with more than 7 oral presentations.
7. The KEMRI/WRP Clinical Research Center received certification in both the Research Pharmacy and Laboratory to conduct NIH/NIAID/Division of AIDS sponsored research, the only such site in East Africa.
8. As part of ongoing quality assurance and preparation for College of American Pathologist (CAP) inspection, the KEMRI/WRP Clinical Research Center enrolled in a series of external quality assurance programs.
9. Seven HIV Program Kenyan staff have either completed or in the process of completing advanced education and training in areas including Biostatistics, Public Health/Administration, Health Systems Management, Community Health/Development, Information Technology, and Business Administration.
10. Twelve medical students, residents, and fellows from DOD affiliated training programs have completed clinical rotations in the HIV program.
11. The HIV Program Deputy Director for HIV Research and Treatment was presented by the CG USMRMC a performance award in recognition of outstanding

dedication and exemplary leadership to the Kenya Medical Research Institute/Walter Reed Project HIV Program.

## **Publications**

Foglia G, Sateren WB, Renzullo PO, Bautista CT, Langat L, Wasunna MK, Singer DE, Scott PT, Robb ML, Birx DL. High prevalence of HIV infection among rural tea plantation residents in Kericho, Kenya. *Epidemiol Infect.* 2007 Jun 29;:1-9.

Sateren W, Foglia G, Renzullo P, Elson L, Wasunna M, Bautista C, Birx D. Epidemiology of HIV-1 Infection in Agricultural Plantation Residents in Kericho, Kenya: Preparation for Vaccine Feasibility Studies. *J Acquir Immune Defic Syndr* 2006;43:102-106.

## **Summary**

The mission of the United States Army Medical Research Unit-Kenya (USAMRU-K), a special foreign activity of the Walter Reed Army Institute of Research (WRAIR), is to develop and test improved means for predicting, preventing and treating worldwide infectious disease threats to deployed U.S. military personnel. USAMRU-K is heavily involved in global surveillance, training, research in drug and vaccine development, and response to emerging infectious disease threats. These activities are undertaken in research laboratories and field stations in locations in Kenya where malaria, HIV/AIDS, leishmaniasis, Rift Valley fever, enteric pathogens, and other military-relevant infectious diseases are prevalent and their transmission rates are high. USAMRU-K also plays a role in the execution of the President's Emergency Plan for AIDS Relief. Our HIV research programs established in the South Rift Valley have served as base for PEPFAR to provide prevention, care and treatment programs to thousands of HIV/AIDS victims in Kenya. Malaria drug and vaccine trials executed in Kombewa and Kondele provide valuable information that will influence protective strategies for the war fighter. During this two-year extension to the Cooperative Agreement with Kenya Medical Research Institute, USAMRU-K's ability to successfully execute clinical studies has been enhanced by the utilization of over 57,000 sq ft of newly constructed space housing state-of-the-art laboratories, a clinical trials center and support activities. The co-location of these modern facilities near existing Government hospitals within areas of high disease endemicity has positioned USAMRU-K as a preferred site and partner for future vaccine, drug, and other interventional trials.



## Appendix 1 - Contract and KEMRI Seconded Personnel

No.	MR Grade	P/No	Employee Name	Designation	Grant
<b>Administration-Ksm</b>					
1	11	80057	Fred Kiddy Onyango	Chief Lab Technologist	Adm-Ksm
2	10	80647	Peter Odundo	Accountant I	Adm-Ksm
3	9	80231	Raphael Pundo Omondi	Senior Computer Programmer	Adm-Ksm
4	4	80050	Consolata Onyango	senior Auxilliary Staff	Adm-Ksm
5	4	80562	Victor Otieno Opondo	Clerical Officer	Adm-Ksm
6	3	80274	Jeconia O.Bunde	Auxilliary Staff I	Adm-Ksm
7	3	80389	Julius M Muhanji	Senior Auxilliary Staff II	Adm-Ksm
8	3	80575	Pamella Adhiambo Onyango	Auxilliary Staff I	Adm-Ksm
9	3	80568	Samson Onyango Owiti	Auxilliary Staff I	Adm-Ksm
10	3	80594	Deborah Kusa Ndengu	Auxilliary Staff I	Adm-Ksm
11	3	80603	George Otieno Ojanja	Auxilliary Staff I	Adm-Ksm
<b>Administration-Nrb</b>					
1	11	80182	Kadenge Kidiga	Principal Accountant	Adm Nrb
2	9	80079	Joyce Mburu	Senior Personal Secretary	Adm Nrb
3	9	80134	Lucy Lodenyi	Senior Computer Programmer	Adm Nrb
4	9	80304	Caroline C. Tungwony	Principal Computer Programmer	Adm Nrb
5	7	20486	Nahashon G. Ngugi	Administrative Officer III	Adm Nrb
6	7	80432	Paul S Moriase	Supplies Assistant I	Adm Nrb
7	7	80403	Pamela A Pande	Lab Technologist III	Adm Nrb
8	6	80550	Eileen Akinyi Ongeso	Copy Typist I	Adm Nrb
9	6	80035	Agnes Nganga	Computer Operator II	Adm Nrb
10	5	80206	John G. Kamau	Senior Driver Grade II	Adm Nrb
11	5	80421	Charles O Morande	Telephone Operator I	Adm Nrb
12	5	80460	Chepkwony, Wilfred K	High clerical officer	Adm Nrb
13	4	80207	Edwin C. Mbwabi	Artisan Grade I	Adm Nrb
14	4	80534	Samuel Macharia	Artisan II	Adm Nrb
15	4	80547	Enock L Makokha	Clerical Officer	Adm Nrb
16	4	80565	Stella Ngarizu Airo	Clerical Officer	Adm Nrb
17	4	80670	Amos N Mwaura	Driver Grade II	Adm Nrb
18	4	80671	Lordvick A Bukhala	Senior Auxiliary Staff II	Adm Nrb
19	4	80672	Maurine K Sore	Senior Auxiliary Staff II	Adm Nrb
20	3	80666	Emmanuel M Amalemba	Auxilliary Staff I	Adm Nrb
<b>Clinical Trials Support</b>					
1	13	80241	Dr. John Njenga Waitumbi	Principal Research Officer	CTS
2	11	80068	Joseph Koros	Principal Lab. Technologist	CTS
3	11	80246	Joram Ogola Siagla	Senior Research Officer	CTS
4	11	21308	Ragama B Ogutu Dr.	Senior Research Officer	CTS
5	11	80645	Dr. Ruth O. Wasuna	Research Officer	CTS
6	11	20174	Agnes N. Kariuki	Principal Nursing Officer	CTS
7	10	21851	Agnes A O Awiti	Senior Nursing Officer	CTS
8	10	21545	Otieno Godfrey A. Dr.	Assistant Research Officer	CTS
9	10	21763	Dr. Lucas Otieno Tina	Assistant Research Officer	CTS
10	10	80646	Dr. Nekeyo N Otsyula	Assistant Research Officer	CTS

11	9	80309	Achola N. Onyango	Administrative Officer I	CTS
12	9	80273	Willis Okoth	Assistant Research Officer	CTS
13	9	80539	Jacob Odika Omwar Apollo	Clinical Officer I	CTS
14	9	80566	Stella Kenyanya Apollo	Nursing Officer I	CTS
15	9	80479	Apolo Duncan O	Assistant Research Officer	CTS
16	9	80652	Margaret C. Koech	Nursing Officer	CTS
17	9	80653	Loice A. Magaria	Nursing Officer I	CTS
18	8	80391	Fredrick M. Mucheru	Senior Engineering Technician	CTS
19	8	21847	Dorothy C Mabunde	Enrolled Community Nurse II	CTS
20	8	21852	Solomon O Otieno	Enrolled Community Nurse II	CTS
21	7	21943	Ondu Priscah A	Enrolled Community Nurse II	CTS
22	7	80377	Stacy M Okalo	Clinical Officer	CTS
23	7	80232	Gordon M. Hongo	Lab Technologist III	CTS
24	7	80386	Imelda A Adongo	Enrolled Nurse II	CTS
25	7	80475	Owino Lilian Were	Clinical officer III	CTS
26	7	80476	Okoth George F. O	Clinical officer III	CTS
27	7	80478	Owira Victorine A	Clinical officer III	CTS
28	7	80468	Okeyo Immaculate A	Short Hand Typist I	CTS
29	7	80522	Linnet Nyanchera Ongeta	Nursing Officer II	CTS
30	7	80552	Duke Mogaka Omariba	Nursing Officer II	CTS
31	7	80531	Robert Njuguna Maina	Laboratory Technologist III	CTS
32	7	80546	Francis Kuria Ndungu	Laboratory Technologist III	CTS
33	7	80593	David Onyango	Laboratory Technologist III	CTS
34	7	80542	George Odhiambo Odongo	Laboratory Technologist III	CTS
35	7	80655	Eunice A. owiti	Clinical Officer III	CTS
36	7	80657	Gladys N. Khaemba	Laboratory Technologist III	CTS
37	7	80658	Eric O. Sedah	Pharmaceutial Technologist III	CTS
38	7	80659	Reuben O Oriko	Computer Programmer III	CTS
39	7	80660	Millicent A. Madara	Computer Programmer III	CTS
40	7	80472	Omondi Mary A	Enrolled Community Nurse II	CTS
41	7	80480	Onyango Susan W A	Enrolled Community Nurse II	CTS
42	6	80244	James Gitonga	Laboratory Technician III	CTS
43	6	80042	Samwel Odour Wangowe	Junior Lab. Technician	CTS
44	6	80371	Kennedy J Obonyo	Lab Technitian III	CTS
45	6	80381	Peter R Mariga	Senior Driver	CTS
46	6	80168	Abdi Ayub	Driver Grade I	CTS
47	6	80368	James S Odera	Lab Technitian III	CTS
48	6	80584	Lillian Ogola Otieno	Pharmaceutial Technician III	CTS
49	6	80527	Peter Benvolio Obare	Laboratory Technician III	CTS
50	6	80524	Nancy Awour Sande	Enrolled Comm. Health Nurse III	CTS
51	6	80544	Fredrick Ouma Ogot	Enrolled Comm. Health Nurse III	CTS
52	6	80540	Jackline Akinyi Juma	Laboratory Technician III	CTS
53	6	80553	Cornel O. Arima	Laboratory Techncian III	CTS
54	6	80662	Rose A Adeny	Enrolled Community Nurse III	CTS
55	6	80663	Celestine A Onyango	Enrolled Community Nurse III	CTS
56	6	80664	Consolata A Apindi	Enrolled Community Nurse III	CTS
57	5	80374	Mary A Amondi	Computer Operator III	CTS
58	5	80467	Pundo, Dennis O.	Computer programmer III	CTS
59	5	80545	Francis Onyango Ooro	Driver Grade I	CTS
60	5	80466	Oyugi, Mary A.	Computer programmer III	CTS

61	4	80354	Beatrice O Akinyi	Clerical Officer	CTS
62	4	80361	Moses D Olweny	Clerical Officer	CTS
63	4	80364	Elizabeth B Akinyi	Clerical Officer	CTS
64	4	80045	Joram Osumo	senior Auxilliary Staff	CTS
65	4	80054	Cyrus Ongonga Onguka	Senior Auxiliary Staff	CTS
66	4	80367	Jacob N Jagongo	Clerical Officer	CTS
67	4	80373	Linnah A Ooro	Clerical Officer	CTS
68	4	80376	Wycliff H Odhiambo	Clerical Officer	CTS
69	4	80585	Ludia Owino Badhi	Clerical Officer	CTS
70	4	80576	Nereah Onyango Omondi	Clerical Officer	CTS
71	4	80595	Dorothy Adhiambo Odera	Clerical officer	CTS
72	4	80601	Fredrick Athero Ayayo	Clerical Officer	CTS
73	4	80538	Yuniah Adhiambo Oluoch	Clerical officer	CTS
74	4	80665	Shenaz M Yusuf	Clerical Officer	CTS
75	3	80355	Caroline A Onoka	Auxilliary Staff I	CTS
76	3	80573	Phelecia O. Omondi	Auxillary Staff I	CTS
77	3	80599	Elly Owuor Akoyo	Auxillary Staff I	CTS
78	3	80563	Thomas Omaset Omedo	Auxillary Staff I	CTS
79	3	80564	Teresa Ongego Odundo	Auxillary Staff I	CTS
80	3	80586	Michael Ochieng Oleche	Auxilliary Staff I	CTS
81	3	80592	Charles Osuo	Auxilliary Staff I	CTS
82	3	80486	Masingu Mackinus	Driver Grade III	CTS
83	3	80487	Gwada Francis R	Driver Grade III	CTS

#### Severe Malaria

1	11	80372	Lilian A Ogonda	Senior Research Officer	HMJF
2	11	80388	Dr.Walter Otieno	Senior Research Officer	HMJF
3	9	80307	Colins O. Odhiambo	Assistant Research Officer	HMJF
4	9	80308	Michael M. Odera	Assistant Research Officer	HMJF
5	7	80310	Titus o. Apindi	Laboratory Technologist III	HMJF

#### Centre of Excellence

1	11	80420	Adhiambo Christine G	Principal Lab.Technologist	COE
2	4	80490	Obadha Caroline A	Copy Typist II	COE

#### RETROVIROLOGY

1	11	80044	David Kiplangat Chumo	Chief Lab Technologist	RETRO
2	11	20260	Kibaya Rukia M	Principal Lab.Technologist	RETRO
3	11	21346	Kipmutai Robert L Dr.	Research Officer	RETRO
4	11	21886	Dr. Peter K. Shikuku	Research Officer	RETRO
5	10	80528	Dr. Rasvinder K Chadha	Assistant Research Officer	RETRO
6	10	80691	Lazarus M. Momanyi	Assistant Research Officer	RETRO
7	9	80406	Koech Hillary K	Senior Accountant	RETRO
8	9	80281	Wilfred Langat	Public Health Officer	RETRO
9	9	80397	Ignatius Kipnge'etich	Senior Computer Programmer	RETRO
10	9	80398	Rachael K Kamau	Assistant Research Officer	RETRO
11	9	80428	Imbuki K Osotsi	Assistant Research Officer	RETRO
12	9	80431	Ngeno Weldon K	Assistant Research Officer	RETRO
13	9	80450	Mokaya John N	Assistant Research Officer	RETRO
14	9	80451	Kimeto Mary L	Assistant Research Officer	RETRO

15	9	80456	Yegon Peter K	Computer Programmer I	RETRO
16	9	80459	Katharane Mary N	Assistant Research Officer	RETRO
17	9	80485	Leonida N. Mongare	Assistant Research Officer	RETRO
18	9	80549	Elizabeth Ngetich	Nursing Officer I	RETRO
19	9	80582	Leonard Ngetich	Accountant II	RETRO
20	9	80556	Rebecca Chebore Boen	Assistant Research Officer	RETRO
21	9	80569	Ruth Jeruto	Assistant Research Officer	RETRO
22	9	80328	Roselidah Oyunga Oyunga	Clerical Officer	RETRO
23	9	80620	Diana J. Kimengich	Nursing Officer I	RETRO
24	9	80654	Romeo W Kithuka	Laboratory Technologist II	RETRO
25	8	80436	Odhiambo Hulda A	Administrator/Counsellor	RETRO
26	8	80535	Samuel Chirchir	Nursing Officer II	RETRO
27	7	80392	Loice C Cheruiyot	Lab Technologist III	RETRO
28	7	80330	Roseline Bosibori Vicky	Lab Technologist III	RETRO
29	7	80396	Eric K Rono	Lab Technologist III	RETRO
30	7	80325	Judy Chebet Bosuben	Community Field Worker	RETRO
31	7	80322	Dennis Ouma Otieno	Community Field Worker	RETRO
32	7	80435	Langat Henry Kipngetich	Administrator/Counsellor	RETRO
33	7	80442	Airo Alice Makungu	Short hand typist	RETRO
34	7	80443	Kimani Thomas	Community Field Worker	RETRO
35	7	80446	Engoke Grace Induti	Library Assistant	RETRO
36	7	80454	Rono Bernard K	Clinical Officer III	RETRO
37	7	80463	Koskei Peter K	Clerical Officer III	RETRO
38	7	80483	Argwings O. Miruka	Clinical Officer	RETRO
39	7	80482	Henry M Sabwengi	Laboratory Technologist III	RETRO
40	7	80501	Sigei Lucy C	Laboratory Technologist III	RETRO
41	7	80557	Bernard Bett Too	Engineering Technologist III	RETRO
42	7	80543	Geoffrey Kiplangat Lelgo	Supplies Assistant I	RETRO
43	7	80607	Isaac Mugo	Lab Technologist III	RETRO
44	7	80610	Janet Nyambura	Lab Technologist III	RETRO
45	7	80533	Roselyne Chelangat Sang	Computer programmer III	RETRO
46	7	80624	Silpher Achieng	Assistant Supplies officer	RETRO
47	7	80626	Margaret C. Ruto	Nursing Officer III	RETRO
48	7	80627	Margaret C. Biomdo	Nursing Officer III	RETRO
49	7	80629	Gladys C. Rop	Nursing Officer III	RETRO
50	7	80630	Beatrice M. Korir	Nursing Officer III	RETRO
51	7	80631	Rael C. Bor	Clinical Officer III	RETRO
52	7	80636	Geoffrey K. Koskei	Clinical Officer III	RETRO
53	7	80656	Everline K Amunavi	Nursing Officer II	RETRO
54	7	21047	David K Bii	Engineering Tech	RETRO
55	6	80257	Michael O. Obonyo	Enrolled Nurse III	RETRO
56	6	80393	Anthony A Keya	Assistant Cateress	RETRO
57	6	80285	Fredrick Ouma Waga	Lab Technologist III	RETRO
58	6	80284	Francis Ochieng Opiyo	Lab Technologist III	RETRO
58	6	80591	Charles Kilel	Public Health Technician	RETRO
59	6	80554	Charles Kiptoo Rotich	Laboratory technician III	RETRO
60	6	80572	Richard Rono	Community Field Worker	RETRO
61	5	21628	Florence C Mitei	Data Machine Operator	RETRO
62	5	80323	Everlyn Ngetich	Higher Clerical Officer	RETRO
63	5	80457	Wambua Winfred	Copy Typist II	RETRO

64	5	80484	Daniel Cheruiyot	Assistant cateress II	RETRO
65	5	80541	Irene Chebet Metet	Computer Operator III	RETRO
66	5	80518	Josphat Rotich	Assistant Cateress III	RETRO
67	5	80520	Leonard Kipkirui Ronoh	Assistant Cateress III	RETRO
68	5	80537	Teresa J. Koech	Assistant Cateress III	RETRO
69	4	80316	David Kamadi Onyino	Clerical Officer	RETRO
70	4	80315	Johnson Ndungu Shiyai	Clerical Officer	RETRO
71	4	80314	Jude Kitur	Driver Grade II	RETRO
72	4	80423	Martim Josphine C	Clerical Officer	RETRO
73	4	80424	Ondego Joyce Ageyo	Clerical Officer	RETRO
74	4	80425	Obiero Emelda Akinyi	Clerical Officer	RETRO
75	4	80439	Ariba Nixon Olungati	Clerical Officer	RETRO
76	4	80453	Bett Justice K	Driver Grade II	RETRO
77	4	80500	Mwangi Geoffrey k	Clerical Officer	RETRO
78	4	80602	Geoffrey K Mutai	Driver Grade II	RETRO
79	4	80517	Joel Langat	Driver Grade II	RETRO
80	4	80634	Geoffrey K. Ngeno	Clerical Officer	RETRO
81	4	21743	Florence C Bonge	Clerical Officer	RETRO
82	3	80324	James Obino	Auxilliary Staff I	RETRO
83	3	80331	Samwel Obino	Auxilliary Staff I	RETRO
84	3	80394	Edna C Mutai	Auxilliary Staff I	RETRO
85	3	80437	Kiromboto Rose k	Auxilliary Staff I	RETRO
86	3	80438	Rugut Eric	Driver Grade III	RETRO
87	3	80445	Rono Paul Cheruyuit	Auxilliary Staff I	RETRO
88	3	80481	Agnes Chepngetich	Auxilliary Staff I	RETRO
89	3	80497	Okello Eunice A.	Auxilliary Staff I	RETRO
90	3	80498	Mogere Lukas M	Auxilliary Staff I	RETRO
91	3	80606	Henry Kiplangat Ngetich	Driver Grade III	RETRO
92	3	80609	Jane Jeruto	Auxilliary Staff I	RETRO
93	3	80611	John K Ronoh	Driver Grade III	RETRO
94	3	80577	Nehemiah Kipkemai Mutai	Driver Grade III	RETRO
95	3	80574	Patrick Watakila M	Driver Grade III	RETRO

#### BU

1	7	80694	Gladys Chepkoech	Computer Programmer III	BU
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#### Vector Studies-Entomology

1	9	80548	Elizabeth N. Kioko	Assistant Research Officer	ENTO
2	9	80605	Helen Koka	Assistant Research Officer	ENTO
3	9	80648	Gladys Chepngetich	Assistant Research Officer	ENTO
4	7	80039	John Kamanza	Senior Laboratory Technician	ENTO
5	7	20441	Reuben M. Lugalia	Laboratory Technician	ENTO
6	4	80252	Maurice Otieno Agawo	senior Auxilliary Staff	ENTO
7	4	80350	Daniel O Ngonga	Clerical Officer	ENTO
8	4	80336	Francis Gare Ngere	Clerical Officer	ENTO
9	4	80337	Nicholas O Odemba	Clerical Officer	ENTO
10	4	80561	Vitalis Omondi Opondo	Driver Grade II	ENTO
11	3	80390	Kizito Amuhaya	Auxilliary Staff I	ENTO

<b>GEIS Support</b>					
1	12	21078	Dr. Jane Mbui	Senior Research Officer	GEIS
2	11	20419	Gitonga Charles M	Principal Lab Technologist	GEIS
3	10	80271	Alexander W. Onyango	Principal Computer Programmer	GEIS
4	9	80305	Shirley C. Segecha	Assistant Research Officer	GEIS
5	9	80259	Alfred Olweny Odindo	Clinical Officer I	HMJF
6	7	80408	Jeremiah K Kambi	Clinical Officer III	GEIS
7	6	80407	Ruth Sarah Mupa	Lab Technitian III	GEIS
8	6	80263	Charles Otieno Adege	Lab Technician III	HMJF
9	5	80074	Jecinta Wanjiru	senior Auxilliary Staff	GEIS
10	4	80519	Justus Odhiambo Gaya	Artisan II	GEIS

<b>ENTERICS</b>					
1	13	20277	William K Sang	Principal Research officer	GEIS
2	9	80418	Bonventure W. Juma	Assistant Research Officer	GEIS
3	7	80230	Valerie A . Oundo	Laboratory Technologist II	GEIS
4	6	21423	Finley Osuna	Laboratory Technician III	GEIS

<b>MDR</b>					
1	12	20405	Maurice Adoyo Adoyo	Senior Research Officer	GEIS
2	9	80317	Freddrick Lunyagi Eyase	Assistant Research Officer	GEIS
3	9	80333	Hoseah Miima Akala	Assistant Research Officer	GEIS

<b>ARBOVIROLOGY</b>					
1	13	20393	Sang Rosemary Dr.	Principal Research officer	GEIS
2	10	21560	Konongoi Samson Dr.	Assistant Research Officer	GEIS
3	7	20957	John M Gachoya	Lab technitian II	GEIS
4	7	21280	Ernest Mabinda	Lab technitian II	GEIS
5	3	20183	Dustone Beti	Driver Grade III	GEIS

<b>FLU</b>					
1	13	80613	Dr. Wallace D Bullimo	Senior Research Officer	GEIS
2	11	80278	Rachael Anyango Achila	Research Officer	GEIS
3	9	80461	Wadegu Meshack	Assistant Research Officer	GEIS
4	9	80622	Evangeline Kinya	Supplies Officer II	GEIS
5	9	80649	Dennis M. Misigo	Assistant Research Officer	GEIS
6	9	80650	Janet M Majanja	Assistant Research Officer	GEIS
7	9	80651	Caroline A Ochieng	Assistant Research Officer	GEIS
8	8	80066	Josphat Mwangi Kabui	Senior Laboartory Technician	GEIS
9	8	80306	Julia Wangui Mwangi	Laboratory Technologist I	GEIS
10	8	30081	Victor Otieno Ofula	Laboratory Technologist I	GEIS
11	7	80661	James O Njiri	Computer Programmer II	GEIS
12	9	80464	Rosemary M Nzunza	Assistant Research Officer	GEIS

<b>PEPFAR</b>					
1	12	21919	Dr. Charles Sigei	Senior Research Officer	PEPFAR
2	11	80583	Leonard Soo	Research Officer	PEPFAR
3	10	80619	Jemutai Tarus	Assistant Research Officer	PEPFAR
4	9	80597	Hellen Mutai	Assistant Research Officer	PEPFAR
5	9	80515	James Ambani	Accountant II	PEPFAR

6	9	80516	Janeth Nyigei	Administrative Officer II	PEPFAR
7	9	80588	William Lonana Shena	Accountant II	PEPFAR
8	9	80523	Martin ocholla	Accountant II	PEPFAR
9	9	80587	Millicent Wachira	Assistant Research Officer	PEPFAR
10	9	80580	William Kimaru Sugut	Nursing Officer I	PEPFAR
11	9	80621	Winnie C. Langat	Assistant Research Officer	PEPFAR
12	9	80623	Wycliffe K. Obwiri	Administrative Officer II	PEPFAR
13	9	80692	Jane Muli Mumbi	Nursing Officer I	PEPFAR
14	9	80693	James W Mukabane	Nursing Officer I	PEPFAR
15	8	80529	Raphael Kipkurgat Langat	Laboratory Technologist II	PEPFAR
16	7	80558	Aaron Kipnetich Ngeno	Laboratory Technologist III	PEPFAR
17	7	80590	Josphat K Bett	Clinical Office III	PEPFAR
18	6	80567	Simon Kipyegon	Pharmaceutical Technician III	PEPFAR
19	6	80536	Sofia Chebet Cherorot	Nutrition Field Worker	PEPFAR
20	4	80600	Erick K Langat	Driver Grade II	PEPFAR
21	4	80440	Chepkwony Geoffrey	Driver Grade II	PEPFAR
22	3	80526	Paul Akava Kibisu	Auxilliary Staff I	PEPFAR

#### OCTANE

1	13	21770	Dr. Fredrick K Sawe	Principal Research Officer	Octane
2	10	80525	Tarus Noah Kiprop	Assistant Research Officer	Octane
3	9	80415	Rono C Hellen	Assistant Research Officer	Octane
4	9	80429	Langat Jayme C	Assistant Research Officer	Octane
5	9	80598	Kipkeu Chemutai	Assistant Research Officer	Octane
6	9	80400	Bornes C. Korir	Assistant Research Officer	Octane
7	7	80589	Abraham Cheruiyot Langat	Clinical Officer III	Octane
8	7	80426	Mburu Jacinta Wambui	Nursing Officer III	Octane
9	7	80625	Langat C. Rither	Nursing Officer III	Octane
10	7	80628	Linnet K. Kisato	Nursing Officer III	Octane
11	5	80633	Jasminder Cherotich	Computer Operator I	Octane
12	3	80637	Hellen Chepkemioi	Auxilliary Staff I	Octane

#### HRP/2- Dr. Waitumbi

1	9	80581	Kifude M Carolyne	Assistant research officer	HRP/2
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